



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,648	07/11/2006	Hiroki Sasaki	Q92478	2627

23373 7590 01/07/2008
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

REDDY, KARUNA P

ART UNIT	PAPER NUMBER
----------	--------------

1796

MAIL DATE	DELIVERY MODE
-----------	---------------

01/07/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,648	Applicant(s) SASAKI ET AL.	
	Examiner Karuna P. Reddy	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/3/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed on 12/3/2007. Claims 1-8 are currently pending in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakunaga et al (US 4, 732, 716).

Prior to setting forth the rejection, it is noted that four or more; five or more; six or more; and at least 50% or more; hydrogen atoms are heavy hydrogen atoms is interpreted by examiner as 100%.

Sakunaga et al disclose an amorphous transparent polymer as an organic substance to be used for the core of optical filament. For example, a homopolymer of methyl methacrylate and a copolymer of at least 70% by weight of methyl methacrylate with up to 30% by weight of a monomer copolymerizable with methyl methacrylate such as norbornyl methacrylate and deuteration products of these polymers formed by substituting all or parts of hydrogen atoms of these polymers by deuterium atoms are preferably used (column 5, lines 31-

50). Deuteration of all hydrogen atoms of these polymers reads on 100% deuteration.

Sakunaga et al fails to exemplify a transparent polymer comprising a deuterated norbornyl methacrylate; and absorbance at 910 nm.

However, Sakunaga et al teach in general disclosure copolymerization of methyl methacrylate with norbornyl methacrylate and the deuteration products of these polymers formed by substituting all or parts of hydrogen atoms are preferred. Therefore, it would have been obvious to replace hydrogen atoms of norbornyl moiety with deuterium, absent evidence of criticality to replacing hydrogen atoms of norbornyl moiety with deuterium.

With respect to absorbance at 910 nm, in light of the fact that Sakunaga et al discloses an optical member comprising essentially similar polymer as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that optical member comprising polymer of prior art exhibits essentially the same property. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

4. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 4, 986, 648) in view of Koike (US 5, 767,200).

Kobayashi et al disclose that norbornyl (meth)acrylate can be prepared by esterification of norborneol with (meth)acrylic chloride or an ester exchange reaction with methyl (meth)acrylates (column 4, lines 57-66) and an optical resin material comprising a polymer containing as an essential component at least one norbornyl acrylate or methacrylate (abstract).

Kobayashi et al is silent with respect to deuteration of norbornyl (meth)acrylate; degree of deuteration and absorbance at 910 nm.

However, Koike et al teach optical resin material wherein it is desirable to have high transparency i.e. transmittancy in the operating wavelength of an optical device. Optical absorbance attributable to expansion and contraction of the C-H bond interferes with absorbance peak wavelength in some cases and coincides with the operating wavelength. The 4th, 5th, 6th and 7th harmonics with an absorbance at 901 nm, 736 nm, 627 nm and 549 nm respectively fall within the wavelength region which is mainly used in the optical communication field. Where the C-H bond of the molecules of the optical resin material is replaced by C-D bond, the above-mentioned peaks disappear. The threshold transmission loss values are drastically improved compared with the case of C-H bond. To obtain an optical resin material with its C-H bond replaced by C-D bond, an MMA-d8 monomer with its H-atom replaced by a D atom may be used for the polymerization to obtain a resin (column 14-61). Therefore, it would have been obvious to replace the hydrogen atoms of C-H bond, in norbornyl (meth)acrylate of Kobayashi et al, with deuterium i.e. heavy hydrogen and obtain a resin for use

in optical members with desirable transparency or transmittancy in the operating wavelength of an optical device.

With respect to the degree of deuteration and absorbance at 910 nm, it is the examiner's position that degree of deuteration is a result-effective variable (MPEP 2144.5) since the degree of deuteration clearly affects absorbance attributed to fourth C-H overtone at 910 nm and thus transparency or transmittancy in the operating wavelength of an optical device. Hence, the choice of a particular degree of deuteration (such as the degree of deuteration in present claims) and thus the absorbance at 910 nm, is a matter of routine experimentation and would have been well within the skill level of, and thus obvious to, one of ordinary skill in the art.

Response to Arguments

5. Applicant's arguments, see page 5, 11-15, filed 12/3/2007, with respect to objection have been fully considered and are persuasive. The objection of claim 8 has been withdrawn.

6. Applicant's arguments with respect to rejection of claims 5-8 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sakunaga et al (US 4, 732, 716), have been considered but are moot in view of the new ground(s) of rejection.
7. Applicant's arguments filed 12/3/2007 have been fully considered but they are not persuasive. Specifically, applicant argues that, (A) Kobayashi et al is silent with respect to deuteration of norbornyl methacrylate and Koike does not mention any specific method for producing such monomer; (B) deuteration of norbornyl methacrylate is conducted in the presence of palladium carbon catalysis; and (C) unexpected superiority in terms of high transparency is not seen in NBXMA-d5 (norbornyl deuterated at 31.3% in the main chain methacrylic acid moiety) compared to WDM-3 (norbornyl methacrylate deuterated at 66.8% in the norbornyl moiety).

With respect to (A), it is already noted in paragraph 7 of office action mailed 12/3/2007, and is incorporated here by reference, that Kobayashi et al is silent with respect to deuteration of norbornyl methacrylate. The esterification of norborneol with (meth)acrylic acid, as claimed is, disclosed in Kobayashi et al, while secondary reference of Koike teaches the advantages of replacing "H" in C-H bond with "D".

With respect to (B), it is noted that the features upon which applicant relies (i.e., deuteration of norbornyl methacrylate in the presence of Pd carbon catalyst)

are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With respect to (C), absorbance at 910 nm is a function of the degree of deuteration and is well recognized in the secondary reference of Koike. The deuteration of 31.3% in NBXMA-d5 (comparative) is lower than deuteration of 66.8% in WDM-3 (deuterated norbornyl methacrylate of present claims). Thus superior properties, as alleged by applicant, are a result of degree of deuteration and naturally flows from the combined teachings of Kobayashi et al and Koike.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karuna P. Reddy whose telephone number is (571) 272-6566.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/565,648
Art Unit: 1796

Page 8

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karuna P Reddy
Examiner
Art Unit 1796

/KR/

/Vasu Jagannathan/
Supervisory Patent Examiner
Technology Center 1700